Evaluation and Certification
ABAR-W375-00-00007

This ABAR involves the modifications of standards previously identified in the approved SRD. Safety Criteria 7.6-1 through 7.6-4 currently reference several sections of the ISMP as the implementing standards. IAEA 50-SG-07, tailored for use on the project, has been identified as the implementing standard that will replace these ISMP sections.

IAEA 50-SG-07 was identified by a multi-disciplined team consisting of the following individuals:

Ian Wheeler, lead	Operational Safety
Ian Milgate	Operations, Maintenance
Bill Mangan	Design
Todd Allen	Safety & Regulatory Programs
John Hammond	Safety Implementation

The project team reviewed a number of possible standards. The Implementing Standard selected was IAEA 50-SG-07, as tailored.

The following standards were reviewed for applicability to the RPP-WTP project;

ASME Oma-S/G-1998, Standards and Guides for Operation and Maintenance of Nuclear Power Plants.
DOE 4330.4b 1994, Maintenance Management Program
ISO 8107:1993, Nuclear Power Plants Maintainability - Terminology
IAEA 50-SG-07, Rev 1, 1990, Maintenance of Nuclear Power Plants

A. Evaluation

The evaluation of IAEA 50-SG-07 was performed from a first principles perspective. The evaluation demonstrated that the standard:

1. Achieves adequate safety,
1. Complies with applicable laws and legal requirements, and
2. Conforms with top-level safety standards and principles stipulated by DOE.

The demonstration of achieving adequate safety has been performed through a comparison with:

- the existing safety criteria for maintenance,
- the RU evaluation of the safety criteria contained in DOE/RL-98-01 and DOE/RL-98-20,
- the RU evaluation of the ISMP sections contained in DOE/RL-98-03,
- and the RU evaluation of the initial safety analysis contained in DOE/RL-98-09.

The RU reviewed the original safety criteria and reported the results of the review in RL/REG-98-01. These safety criteria were conditionally approved, as noted in sections 3.2.3.3.5 (Operational Testing, Inspection and Maintenance) and 3.2.4.2, (Process Safety Management Program). The conditions noted were incorporated into revision 1 of the SRD. The revisions were reviewed by the RU and the results documented in RL/REG-98-20, sections 3.8 (Reliability, Availability, Maintainability, Inspectability) and 3.13 (Operational Testing, Inspection, and Maintenance). Section 3.8 concluded that top-level principle 4.2.7.1 was not adequately addressed in the implementing standards and Appendix A to the SRD was added in response to this open item. Section 3.13 concluded that the implementing standards contained in the SRD for Operational Testing, Inspection and Maintenance were adequate for preliminary design but

an adequate implementing standard was to be identified prior to authorization for construction. Acceptance of IAEA 50-SG-07 will close this action.

Evaluation Against Applicable Laws and Regulation

Safety criteria 7.6-1 through 7.6-4 reference 29 CFR 1910.119(j)(2) – (6), 40 CFR 61.14(b), 40 CFR 68.56 and WAC 246-247.075(12) as part of the regulatory basis.

29 CFR 1910.119(j)(2) – (6) – Mechanical Integrity

(2) Written procedures. The employer shall establish and implement written procedures to maintain the on-going integrity of process equipment.

(3) Training for process maintenance activities. The employer shall train each employee involved in maintaining the on-going integrity of process equipment in an overview of that process and its hazards and in the procedures applicable to the employee's job tasks to assure that the employee can perform the job tasks in a safe manner.

(4) Inspection and testing.

- *(i) Inspections and tests shall be performed on process equipment.*
- *(ii) Inspection and testing procedures shall follow recognized and generally accepted good engineering practices.*
- *(iii) The frequency of inspections and tests of process equipment shall be consistent with applicable manufacturers' recommendations and good engineering practices, and more frequently if determined to be necessary by prior operating experience.*
- *(iv) The employer shall document each inspection and test that has been performed on process equipment. The documentation shall identify the date of the inspection or test, the name of the person who performed the inspection or test, the serial number or other identifier of the equipment on which the inspection or test was performed, a description of the inspection or test performed, and the results of the inspection or test.*

(5) Equipment deficiencies. The employer shall correct deficiencies in equipment that are outside acceptable limits (defined by the process safety information in paragraph (d) of this section) before further use or in a safe and timely manner when necessary means are taken to assure safe operation.

(6) Quality assurance.

- *(i) In the construction of new plants and equipment, the employer shall assure that equipment as it is fabricated is suitable for the process application for which they will be used.*
- *(ii) Appropriate checks and inspections shall be performed to assure that equipment is installed properly and consistent with design specifications and the manufacturer's instructions.*
- *(iii) The employer shall assure that maintenance materials, spare parts and equipment are suitable for the process application for which they will be used.*

Evaluation: The five subsections noted above are addressed as follows:

- Written procedures – written procedures for maintenance activities are required under section 4, Administrative Controls, of the standard.
- Training – training is required as addressed in paragraphs 306 – 312, Selection and Training of Maintenance Personnel. Paragraph 312 specifically addresses training in understanding of plant systems, as appropriate for the job.
- Inspections and testing – paragraph 209 defines preventive maintenance as including testing and inspections in order to detect incipient failures and to assure continued operability of the facility.

- Equipment deficiencies – paragraphs 104 through 108 define the scope of the standard. The scope statement recognizes that an effective preventive and remedial maintenance program is required to ensure all SSCs are capable of performing as intended.
- Quality assurance – quality assurance, in general, is discussed in several locations throughout the standard. The specific requirements from subsection (6)(iii) are addressed in paragraphs 803 and 804 which require that 1. adequate tools, spares and resources are available and 2. that spares meet the same technical requirements as the original installed item.

40 CFR 61.14(b) - Monitoring Requirements

(b) Each owner or operator shall maintain and operate each monitoring system as specified in the applicable subpart and in a manner consistent with good air pollution control practice for minimizing emissions. Any unavoidable breakdown or malfunction of the monitoring system should be repaired or adjusted as soon as practicable after its occurrence. The Administrator's determination of whether acceptable operating and maintenance procedures are being used will be based on information which may include, but not be limited to, review of operating and maintenance procedures, manufacturer recommendations and specifications, and inspection of the monitoring system.

Evaluation: Paragraphs 406 and 409 specifically address the requirements for preplanning maintenance tasks and the development of maintenance instructions.

40 CFR 68.56 - Maintenance.

(a) The owner or operator shall prepare and implement procedures to maintain the on-going mechanical integrity of the process equipment. The owner or operator may use procedures or instructions provided by covered process equipment vendors or procedures in Federal or state regulations or industry codes as the basis for stationary source maintenance procedures.

(b) The owner or operator shall train or cause to be trained each employee involved in maintaining the on-going mechanical integrity of the process. To ensure that the employee can perform the job tasks in a safe manner, each such employee shall be trained in the hazards of the process, in how to avoid or correct unsafe conditions, and in the procedures applicable to the employee's job tasks.

(c) Any maintenance contractor shall ensure that each contract maintenance employee is trained to perform the maintenance procedures developed under paragraph (a) of this section.

(d) The owner or operator shall perform or cause to be performed inspections and tests on process equipment. Inspection and testing procedures shall follow recognized and generally accepted good engineering practices. The frequency of inspections and tests of process equipment shall be consistent with applicable manufacturers' recommendations, industry standards or codes, good engineering practices, and prior operating experience.

Evaluation: With the exception of maintenance contractor training, the requirements of 40 CFR 68.56 are addressed as noted for 29 CFR 1910.119(j)(2) – (6) above. The requirements for maintenance contractor training are addressed in paragraph 414 of the standard.

WAC 246-247.075(12) - Monitoring, Testing and Quality Assurance.

(12) All facilities must be able to demonstrate that appropriate supervisors and workers are adequately trained in the use and maintenance of emission control and monitoring systems, and in the performance of associated test and emergency response procedures.

Evaluation: Paragraphs 306 through 312 of the standard address training of maintenance personnel.

Conclusion: The standard adequately address the requirements imposed by applicable laws.

Evaluation Against Applicable Top-Level Principles

4.2.1.1 Safety Design

The facility should be designed for a set of events such as: normal operation, including anticipated operational
occurrences, maintenance, and testing; external events; and postulated accidents.

Evaluation: The facility is designed and analyzed considering normal operation, including anticipated operational
occurrences, maintenance, and testing; external events; and postulated accidents. The results of the analyses are considered when establishing the classification of SSCs. As addressed in paragraph 201 of the standard, the maintenance program will address the important to safety SSCs.

4.2.1.2 Risk Assessment

Acceptable risk analyses should be applied during the design to delineate provisions for the prevention and
mitigation, including emergency preparedness and response, of otherwise risk-dominant events.

Evaluation: The results of the safety analyses, which include the reliability of SSCs, will be considered when establishing the requirements for preventive maintenance. The specific requirements are located in paragraph 212 of the standard.

4.2.1.3 Safety Analysis

A safety analysis should be carried out as required to evaluate the safety performance of the design and identify
requirements for operations.

Evaluation: The maintenance program established in accordance with IAEA 50-SG-07 will be applied in accordance with the safety analyses performed in accordance with this top-level principle. Although the standard does not call for safety analysis to be performed, sections 209 through 214 clearly state that "safety report" requirements are incorporated into the maintenance program.

4.2.7.1 Reliability

Reliability targets should be assigned to structures, systems, and components or functions important to safety. The targets should be consistent with the roles of the structures, systems, and components or functions in different accident conditions. Provision should be made for appropriate testing and inspection of structures, systems, and components for which reliability targets have been set.

Evaluation: Paragraph 212 of implementing standard requires that the frequency and extent of preventive maintenance be established such that the reliability and effectiveness of SSCs remain in accord with the design assumptions and intent.

4.3.5.1 Operational Testing, Inspection, and Maintenance

Structures, systems, and components important to safety should be the subject of appropriate, regular preventive maintenance, inspection, and testing and servicing when needed, to ensure that they remain capable of meeting their design requirements throughout the life of the facility. Such activities should be carried out in accordance with written procedures supported by quality assurance measures.

Evaluation: Sections 2 (Maintenance Programme) and 4 (Administrative Controls) of the implementing standard describe the requirements for establishing the maintenance program, including preventive maintenance, and for developing maintenance procedures..

5.2.7 Mechanical Integrity

The Contractor should implement a mechanical integrity program that includes written procedures, training for maintenance activities, inspection and performance testing of process equipment, and quality assurance measures. The program should include measures to correct deficiencies in equipment that are outside acceptable limits.

Evaluation: The requirement of the top-level principle are addressed in the standard as follows:

- Written procedures – written procedures for maintenance activities are required under section 4, Administrative Controls, of the standard.
- Training – training is required as addressed in paragraphs 306 – 312, Selection and Training of Maintenance Personnel. Paragraph 312 specifically addresses training in understanding of plant systems, as appropriate for the job.
- Inspections and testing – paragraph 209 defines preventive maintenance as including testing and inspections in order to detect incipient failures and to assure continued operability of the facility.
- Quality assurance – quality assurance, in general, is discussed in several locations throughout the standard. The specific requirements from subsection (6)(iii) are addressed in paragraphs 803 and 804 which require that 1. adequate tools, spares and resources are available and 2. that spares meet the same technical requirements as the original installed item.

Conclusion: IAEA 50-SG-07 adequately addresses and conforms with top-level principles 4.2.1, 4.3.1.1, 4.3.1.2, 4.3.1.3, 4.3.1.4, and 5.3.1.

Evaluation Against Applicable Safety Criteria

Safety Criterion: 7.6 - 1

A maintenance program for the facility shall be developed and implemented using a tailored approach.

Evaluation: Requirements of a maintenance program addressed in section 2, Maintenance Programme, of the implementing standard.

Safety Criterion: 7.6 - 2

The maintenance program shall contain provisions sufficient to preserve, predict, and restore the availability, operability, and reliability of structures, systems, and components designated as Important to Safety.

Evaluation: The standard states in section 102, Objective, that the maintenance program is developed to ensure the level of reliability and effectiveness of all SSCs having a bearing on safety remains in accordance with design assumptions and intent.

Safety Criterion: 7.6 - 3

The maintenance program for Important to Safety Structures, systems and components shall clearly define:

(1) The Important to Safety structures, systems, and components that comprise the facility;
(2) The requirements of the maintenance program that are derived from the program elements listed in Safety Criterion 7.6-4.
(3) The management systems used for those activities, including the means for monitoring and measuring the effectiveness of the program and the management of maintenance backlog;
(4) The assignment of responsibilities and authority for all levels of the maintenance organization,
(5) Mechanisms to feedback such relevant information as trend analysis and instrumentation performance/reliability data in order to identify necessary program modifications,
(6) Provisions for identifying and evaluating possible component, system design, occupational safety and health, or other relevant problems and implementation of a self-assessment program;
(7) Performance indicators and criteria to be utilized to measure equipment, systems, and personnel effectiveness in maintenance activities;
(8) Interfaces between maintenance and other organizations (e.g., involving operations, engineering, quality, and safety); and
(9) Quantitative reliability target values for systems and components to start or run, when such values are credited in safety analysis.
(10) Appropriate authorization is received before modification starts on a safety instrumented system.
(11) Assessment of impact of the modification on the functionality of the safety instrumented system is performed, to ensure functionality is not impaired.

Evaluation: The requirements of the safety criterion are addressed as follows:

(1) Section 2, Maintenance Programme, requires that the maintenance program be developed to address important to safety SSCs.
(2) See the evaluation or safety criterion 7.6-4 below.
(3) Section 11, Surveillance Review and Audit Programme, addresses the means for monitoring the effectiveness of the maintenance program.
(4) Section 3, Organization and Responsibilities for Maintenance" requires that the responsibilities of the maintenance staff be defined in writing.
(5) Section 9, Feedback of Experience, requires that collecting information, analyzing trends, and feeding back lessons learned be addressed in the maintenance program.
(6) Section 11, Surveillance Review and Audit Programme, discusses the need and requirements for a self-assessment program. Evaluation of maintenance data is addressed in (5) above.
(7) Section 11, Surveillance, Review and Audit Programme, address the review of the maintenance program in paragraphs 1103 through 1106 to evaluate the effectiveness of the program.
(8) Section 3, Organization and Responsibilities for Maintenance, addresses the responsibilities of the maintenance program in general. Paragraph 304 specifically requires that the maintenance group work in coordination with such groups as operations, QA, etc. Throughout the standard are requirements for interfacing with design.
(9) Paragraph 212 requires that design assumptions and intents be considered when establishing the frequency for preventive maintenance. One item specifically required to be considered is the probability of failure to function properly.
(10) Section 7, Modifications, provides the requirements for review of modifications.

(11) See (10) above.

Safety Criterion: 7.6 – 4

The maintenance program shall address each of the following elements:

(1) Organization and administration;
(2) Maintenance training and qualification;
(3) Maintenance facilities, equipment, and tools;
(4) Types of maintenance;
(5) Maintenance procedures and other work-related documents;
(6) Planning, scheduling, and coordinating maintenance activities;
(7) Control of maintenance activities;
(8) Postmaintenance testing;
(9) Procurement of parts, materials, and services;
(10) Material receipt, inspection, handling, storage, retrieving, and issuance;
(11) Control and calibration of measuring and test equipment;
(12) Maintenance tools and equipment control;
(13) Documented facility condition inspections to identify and address aging effects;
(14) Management involvement with facility operations;
(15) Maintenance history and trending;
(16) Analysis of maintenance-related problems;
(17) Modification work.

Evaluation: The development of the maintenance program is described in Section 2 of the standard.

Evaluation: Each of the topics is addressed as noted below:

(1) Section 3, Organization and Responsibilities for Maintenance
(2) Section 3, Organization and Responsibilities for Maintenance
(3) Section 5, Maintenance Facilities
(4) Section 2, Maintenance Programme
(5) Section 4, Administrative Controls
(6) Section 4, Administrative Controls
(7) Section 4, Administrative Controls
(8) Section 4, Administrative Controls
(9) Section 8, Stores and Procurement
(10) Section 8, Stores and Procurement
(11) RPP-WTP QAP Section 5.3.5
(12) RPP-WTP QAP Section 5.3.5
(13) Section 2, Maintenance Programme
(14) Section 3, Organization and Responsibities for Maintenance
(15) Section 9, Feedback of Experience
(16) Section 9, Feedback of Experience
(17) Section 7, Modifications

Conclusion: IAEA 50-SG-07 appropriately implements the requirements of safety criteria 7.6-1 through 7.6-4.

Identification of Commitments and Evaluation

DOE/RL-98-01, DOE/RL-98-03, DOE/RL-98-09, and DOE/RL-98-20 were reviewed to identify any commitments identified by the Regulatory Unit during review of the ISAR, ISMP or SRD. One ISMP commitments was specifically identified by the RU in their assessment of the ISAR (DOE/RL-98-09, section 3.4.6). The commitment is:

> "5. The ISMP contains a commitment to implement a mechanical integrity program that includes: 1) written procedures, 2) training for maintenance activities, 3) inspection and performance testing of process equipment, 4) quality assurance measures, and 5) measures to correct deficiencies in equipment that are outside acceptable limits."

As discussed above, IAEA 50-SG-07 adequately implements the points contained in the above commitment.

Conclusion

The adoption of IAEA 50-SG-07, as tailored will:

1. achieve adequate safety,
2. comply with applicable laws and regulations,
3. conform with top-level safety standards and principles stipulated by DOE,
4. not result in a reduction in commitment relied on by the RU in reaching a regulatory decision, and
5. will close condition 3.13 of RL/REG 98-20 on approval of this ABAR.

References

BNFL-5193-SRD-01, Revision 2e, TWRS-P Safety Requirements Document

BNFL-5193-ISM-01, Revision 4b, TWRS-P Integrated Safety Management Plan

BNFL-5193-ISAR-01, Revision 0, TWRS-P Initial Safety Analysis Report

DOE/RL-96-0005, Revision 1, Concept of the DOE Regulatory Process for Radiological, Nuclear, and Process Safety for TWRS Privatization Contractors

DOE/RL-96-0006, Revision 1, Top-Level Radiological, Nuclear, and Process Safety Standards and Principles for TWRS Privatization Contractors

DOE/RL-98-01, DOE Regulatory Unit Evaluation Report of the BNFL Inc. Safety Requirements Document

DOE/RL-98-03, DOE Regulatory Unit Evaluation Report of the BNFL Inc. Integrated Safety Management Plan

DOE/RL-98-09, DOE Regulatory Unit Evaluation Report of the BNFL Inc. Initial Safety Assessment

DOE/RL-98-20, DOE Regulatory Unit Evaluation of BNFL Inc. Safety Requirements Document, Revision 1

B. Certification of SRD Changes

The SRD continues to identify a set of standards that, when implemented, will provide adequate safety, comply with all applicable laws and regulations, and conform to top-level safety standards.

Certification that the revised SRD identifies a set of standards that continues to provide adequate safety, comply with all applicable laws and regulation, and conform to top-level safety standards is based on adherence to the DOE/RL-96-0004 Standards Identification Process and successful completion of review and confirmation by the PSC.

TWRS-P General Manager/Designee - Approval	Date